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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,436	12/10/2003	Takeo Kuramoto	1057/HIROSE	5110
27649	7590	04/05/2005	EXAMINER	
MICHAEL TOBIAS			BEREZNY, NEMA O	
#40			ART UNIT	
1717 K ST. NW, SUITE 613			PAPER NUMBER	
WASHINGTON, DC 20036			2813	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/731,436

Applicant(s)

KURAMOTO ET AL. 

Examiner

Nema O. Berezny

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 18-26 is/are pending in the application.
- 4a) Of the above claim(s) 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 19-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 04092004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-10 and 19 in the reply filed on 1-31-05 is acknowledged. Cancellation of claims 11-17 is acknowledged. Claims 1-10 and 18-26 are currently pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-5, 7-10, 19, 21-24, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Steitz (3,719,981). Steitz discloses a solder ball assembly for use in the formation of solder bumps comprising a heat-resisting sheet (Figs.1-4 el.22) having a plurality of holes (el.24), a solder ball (el.26) displaced in each hole, and an adherent layer (el.20) disposed within the sheet, the adherent layer being exposed to the interior of each hole in such a manner that the adherent layer contacts and holds the solder ball in the hole (Figs.1,3) **[claim 1]**. Steitz also discloses wherein the heat-resisting sheet comprises a material selected from the group consisting of resins, metals, ceramics, paper, and combinations of two or more of these materials (col.3 lines 5-9) **[claim 2]**; wherein each hole has a bottom surface and the adherent layer is

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exposed to the interior of each hole on the bottom surface of the hole (Figs.1-3) **[claim 4]**; wherein each hole is straight and has a wall extending perpendicularly to a surface of the heat-resisting sheet (Fig.2) **[claim 5]**; wherein each hole is a blind hole (Fig.2) **[claim 7]**; wherein the depth of each blind hole is at least one third the diameter but smaller than the diameter of the solder ball disposed therein (Fig.4) **[claim 8]**; wherein the depth of each blind hole is at least one half the diameter but smaller than the diameter of the solder ball disposed therein (Fig.4) **[claim 9]**; and which further comprises a covering placed atop the heat-resisting sheet to cover the solder balls disposed in the holes (Fig.9 no #) **[claim 10]**. Steitz also discloses a sheet for use in forming solder bumps on a substrate having a plurality of electrodes, comprising a heat-resisting sheet (el.22) having a plurality of holes (el.24) arranged in the same pattern as the electrodes of a substrate (col.3 lines 5-8), each hole being capable of receiving a solder ball therein (Fig.3), and an adherent layer (el.20) disposed within the sheet, the adherent layer being exposed to the interior of each hole in such a manner that when a solder ball is disposed in the hole, the adherent layer contacts and holds the solder ball in the hole (Fig.4) **[claim 19]**. Steitz also discloses wherein the adherent layer extends between adjoining holes inside the heat-resisting sheet (Fig.4) **[claim 21]**; wherein the adherent layer comprises a sheet of an adhesive material (col.3 lines 1-5) **[claim 22]**; wherein the adherent layer prevents the solder balls from falling out of the holes when the assembly is oriented such that the solder balls would fall out of the holes in the absence of the adherent layer (col.3 lines 10-20) **[claim 23]**; wherein each solder ball protrudes from the heat-resisting sheet and the covering conforms to the shape of the

protruding portions of the solder balls (Fig.9) **[claim 24]**; and wherein the adherent layer extends between adjoining holes inside the heat-resisting sheet (Fig.4) **[claim 26]**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 20, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steitz as applied to claims 1 and 19 above, and further in view of Endo (JP 11-297769). Steitz does not disclose an adherent layer exposed on a wall of the hole. However, Steitz would look to one such as Endo for better ball gripping because Endo discloses wherein the adherent layer is exposed to the interior of each hole on a wall (Fig.1 el.5a) of the hole. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the adherent layer of Endo with the assembly of Steitz. The interior tape of Endo extends into the hole beyond the base walls which holds the balls in the holes better (Endo - Fig.1) **[claim 3]**.

Steitz does not disclose first and second heat-resisting layers. However, Steitz would look to one such as Endo for delayed cracking because Endo discloses wherein the heat-resisting sheet comprises first (Fig.1 el.13) and second (el.6) heat-resisting layers, and the adherent layer (el.5a) is sandwiched between the first and second heat-resisting layers. Therefore, it would have been obvious to a person of ordinary skill in

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the art at the time of the invention to use the first and second heat-resisting layers of Endo with the assembly of Steitz to delay cracking of the layers (Endo - Solution) [claims 20, 25].

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Steitz as applied to claim 1 above, and further in view of Ochiai et al. (6,319,810). Steitz does not disclose and gradually tapered hole. However, Steitz would look to one such as Ochiai for identical size and shape of holes because Ochiai discloses wherein each hole is tapered and has a diameter which gradually decreases toward a bottom of the hole (Fig.1A). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the tapered holes of Ochiai with the assembly of Steitz in order to produce multiple holes of identical size and shape (Ochiai - col.5 lines 31-34).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nema O. Berezny whose telephone number is (571) 272-1686. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NB


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